

What is Claimed is:

1. A method for managing a defective area on a recording medium of writable once type, the recording medium including a data area, the data area having a spare area, the method comprising:
 - (a) detecting an existence of a defective area within the data area of the recording medium once data are written onto the data area in a data writing operation;
 - (b) writing data written in the defective area onto the spare area if the defective area is detected;
 - (c) writing temporary management information pertaining to the defective area, onto a temporary management area on the recording medium; and
 - (d) writing access information for accessing the temporary management information, onto a reserved area on the recording medium.
2. The method as claimed in claim 1, wherein in the writing step (c), the temporary management area is located within a non-user data area of the data area on the recording medium.
3. The method as claimed in claim 2, wherein the recording medium includes first and second recording layers having first and second data areas, respectively, and wherein in the writing step (c), the temporary management area includes first and second temporary management areas respectively located within the first and second data areas.
4. The method as claimed in claim 1, wherein in the writing step (c), the temporary management area is located outside of the data area on the recording medium.
5. The method as claimed in claim 4, wherein the temporary management area is located in a lead-in area on the recording medium.

6. The method as claimed in claim 4, wherein the recording medium includes first and second recording layers, the first recording layer having a first data area and a lead-in area, the second recording layer having a second data area and a lead-out area, and wherein the temporary management area and the reserved area are both located within at least one of the lead-in area of the first recording layer and the lead-out area of the second recording layer.

7. The method as claimed in claim 1, wherein in the writing step (d), the reserved area is located outside of the data area on the recording medium.

8. The method as claimed in claim 7, wherein the reserved area is located in a lead-in area or a lead-out area on the recording medium.

9. The method as claimed in claim 7, wherein the recording medium includes first and second recording layers having first and second data areas, respectively, and wherein in the writing step (d), the reserved area includes first and second reserved areas respectively located outside of the first and second data areas.

10. The method as claimed in claim 2, wherein in the writing step (d), the reserved area is located outside of the data area on the recording medium.

11. The method as claimed in claim 10, wherein the recording medium includes first and second recording layers having first and second data areas, respectively,

in the writing step (c), the temporary management area includes first and second temporary management areas respectively located within the first and second data areas, and

in the writing step (d), the reserved area includes first and second reserved areas respectively located outside of the first and second data areas.

12. The method as claimed in claim 4, wherein in the writing step (d), the reserved area is also located outside of the data area on the recording medium.

13. The method as claimed in claim 12, wherein the recording medium includes first and second recording layers having first and second data areas, respectively,

in the writing step (c), the temporary management area includes first and second temporary management areas respectively located outside of the first and second data areas, and

in the writing step (d), the reserved area includes first and second reserved areas respectively located outside of the first and second data areas.

14. The method as claimed in claim 1, wherein in the writing step (c), the temporary management information includes temporary defect list (TDFL) information having at least one temporary defect list (TDFL), the at least one temporary defect list identifying a location of the defective area and a location of a replacement area in the spare area corresponding to the defective area.

15. The method as claimed in claim 14, wherein the at least one TDFL further includes status information identifying whether a defect is present in the replacement area of the spare area.

16. The method as claimed in claim 15, further comprising:

(e) examining status information in a current defect entry of the at least one TDFL during a data reproduction operation; and

(f) disregarding data reproduced using a previous defect entry associated with the current defect entry, if the status information in the current defect entry indicates that a defect is present in a part of the spare area associated with the previous defect entry.

17. The method as claimed in claim 1, wherein in the writing step (d), the access information includes temporary disc definition structure (TDDS) information identifying location information pertaining to the temporary management information on the recording medium.

18. The method as claimed in claim 17, wherein in the writing step (d), the access information further includes flag information indicating whether at least one of the spare area and the temporary management area is full.

19. The method as claimed in claim 1, further comprising:

(g) transferring, at finalization of a data writing operation on the recording medium, the temporary management information and the access information as defect management area (DMA) information into an area outside of the data area on the recording medium.

20. The method as claimed in claim 19, wherein in the transferring step (g), the area outside of the data area is a lead-in area or a lead-out area on the recording medium.

21. The method as claimed in claim 1, wherein the recording medium is a Blu-ray Disc Write Once (BD-WO).

22. A method for managing a defective area on a recording medium of writable once type, the recording medium including a data area, the data area having a spare area, the method comprising:

writing data written in the defective area onto the spare area if the defective area is detected;

writing temporary management information pertaining to the defective area, onto a temporary management area on the recording medium;

writing access information for accessing the temporary management information, onto a reserved area on the recording medium; and

transferring, at finalization of a data writing operation on the recording medium, the temporary management information and the access

information as defect management area (DMA) information into another area on the recording medium.

23. The method as claimed in claim 22, wherein in the transferring step, the another area on the recording medium includes at least one of a lead-in area and a lead-out area on the recording medium.

24. The method as claimed in claim 22, wherein the recording medium is a Blu-ray Disc Write Once (BD-WO).

25. An apparatus for managing a defective area on a recording medium of writable once type, the recording medium including a data area, the data area having a spare area, the apparatus comprising:

(a) means for detecting an existence of a defective area within the data area of the recording medium once data are written onto the data area in a data writing operation;

(b) means for writing data written in the defective area onto the spare area if the defective area is detected;

(c) means for writing temporary management information pertaining to the defective area, onto a temporary management area on the recording medium; and

(d) means for writing access information for accessing the temporary management information, onto a reserved area on the recording medium.

26. An apparatus for managing a defective area on a recording medium of writable once type, the recording medium including a data area, the data area having a spare area, the apparatus comprising:

(a) means for writing data written in the defective area onto the spare area if the defective area is detected;

(b) means for writing temporary management information pertaining to the defective area, onto a temporary management area on the recording medium;

(c) means for writing access information for accessing the temporary management information, onto a reserved area on the recording medium; and

(d) means for transferring, at finalization of a data writing operation on the recording medium, the temporary management information and the access information as defect management area (DMA) information into another area on the recording medium.

27. A recording medium of writable once type, comprising:

at least one recording layer including a data area, the data area having a spare area,

wherein an existence of a defective area within the data area of the recording medium is detected once data are written onto the data area in a data writing operation,

data written in the defective area is written onto the spare area if the defective area is detected,

temporary management information pertaining to the defective area is written onto a temporary management area on the recording medium, and

access information for accessing the temporary management information is written onto a reserved area on the recording medium.

28. The recording medium as claimed in claim 27, wherein the data area includes a user data area and a non-user data area, and the temporary management area is located within the non-user data area on the recording medium.

29. The recording medium as claimed in claim 28, wherein the at least one recording layer includes first and second recording layers having first and second data areas, respectively, and the temporary management area includes first and second temporary management areas respectively located within the first and second data areas.

30. The recording medium as claimed in claim 27, wherein the

temporary management area is located outside of the data area on the recording medium.

31. The recording medium as claimed in claim 30, wherein the temporary management area is located in a lead-in area on the recording medium.

32. The recording medium as claimed in claim 30, wherein the at least one recording layer includes first and second recording layers, the first recording layer having a first data area and a lead-in area, the second recording layer having a second data area and a lead-out area, and wherein the temporary management area and the reserved area are both located within at least one of the lead-in area of the first recording layer and the lead-out area of the second recording layer.

33. The recording medium as claimed in claim 27, wherein the reserved area is located outside of the data area on the recording medium.

34. The recording medium as claimed in claim 33, wherein the at least one recording layer further includes a lead-in area or a lead-out area, and the reserved area is located in the lead-in area or the lead-out area on the recording medium.

35. The recording medium as claimed in claim 33, wherein the at least one recording layer includes first and second recording layers having first and second data areas, respectively, and the reserved area includes first and second reserved areas respectively located outside of the first and second data areas.

36. The recording medium as claimed in claim 28, wherein the reserved area is located outside of the data area including the user data area on the recording medium.

37. The recording medium as claimed in claim 36, wherein the at least one recording layer includes first and second recording layers having first and second data areas, respectively,

the temporary management area includes first and second temporary management areas respectively located within the first and second data areas, and

the reserved area includes first and second reserved areas respectively located outside of the first and second data areas.

38. The recording medium as claimed in claim 30, wherein the reserved area is also located outside of the data area on the recording medium.

39. The recording medium as claimed in claim 38, wherein the at least one recording layer includes first and second recording layers having first and second data areas, respectively,

the temporary management area includes first and second temporary management areas respectively located outside of the first and second data areas, and

the reserved area includes first and second reserved areas respectively located outside of the first and second data areas.

40. The recording medium as claimed in claim 27, wherein the temporary management information includes temporary defect list (TDFL) information having at least one temporary defect list (TDFL), the at least one temporary defect list identifying a location of the defective area and a location of a replacement area in the spare area corresponding to the defective area.

41. The recording medium as claimed in claim 40, wherein the at least one TDFL further includes status information identifying whether a defect is present in the replacement area of the spare area.

42. The recording medium as claimed in claim 40, wherein the location of the defective area and the location of a replacement area in the spare area corresponding to the defective area are represented in physical sector numbers.

43. The recording medium as claimed in claim 27, wherein the access information includes temporary disc definition structure (TDDS) information identifying location information pertaining to the temporary management information on the recording medium.

44. The recording medium as claimed in claim 43, wherein the access information further includes flag information indicating whether at least one of the spare area and the temporary management area is full.

45. The recording medium as claimed in claim 27, wherein the at least one recording layer further includes an area outside of the data area on the recording medium,

where, at finalization of a data writing operation on the recording medium, the temporary management information and the access information are transferred into the area outside of the data area as defect management area (DMA) information.

46. The recording medium as claimed in claim 45, wherein the area outside of the data area is a lead-in area or a lead-out area on the recording medium.

47. The recording medium as claimed in claim 27, wherein the recording medium is a Blu-ray Disc Write Once (BD-WO).

48. A recording medium of writable once type, comprising:
at least one recording layer including a data area and an area outside of the data area, the data area having a spare area,
wherein data written in a defective area of the data area is written

onto the spare area if the defective area is detected,

temporary management information pertaining to the defective area is written onto a temporary management area on the recording medium,

access information for accessing the temporary management information is written onto a reserved area on the recording medium, and

at finalization of a data writing operation on the recording medium, the temporary management information and the access information are transferred into the area outside of the data area as defect management area (DMA) information.

49. The recording medium as claimed in claim 48, wherein the area outside of the data area on the recording medium includes at least one of a lead-in area and a lead-out area on the recording medium.

50. The recording medium as claimed in claim 48, wherein the recording medium is a Blu-ray Disc Write Once (BD-WO).